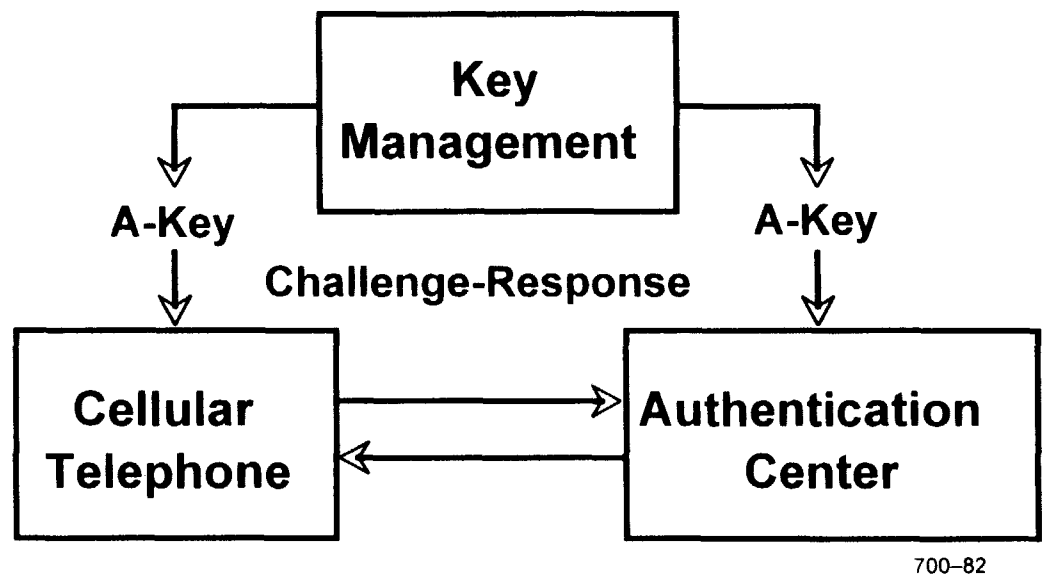
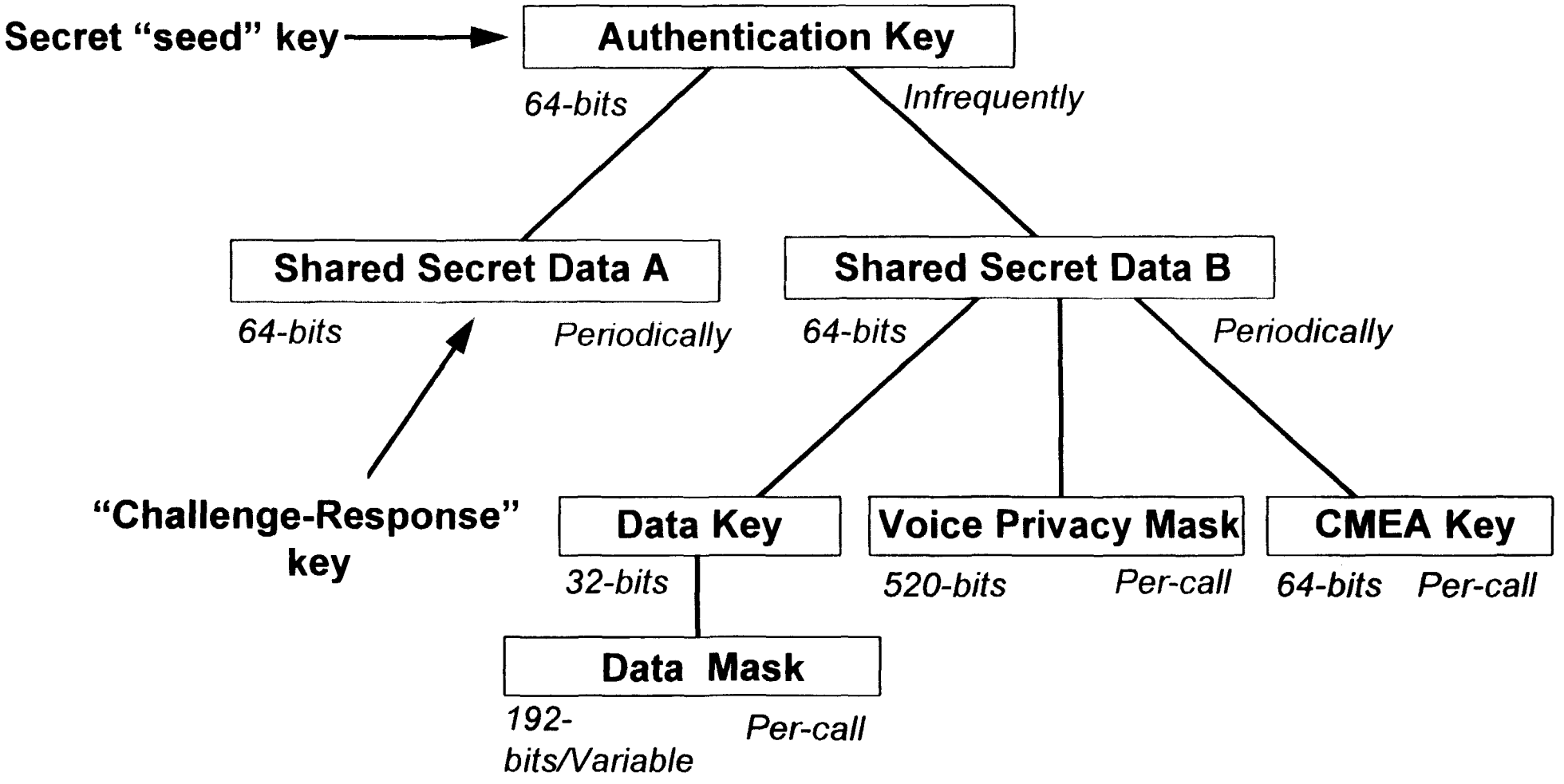
Key Management for Cellular – A Challenge



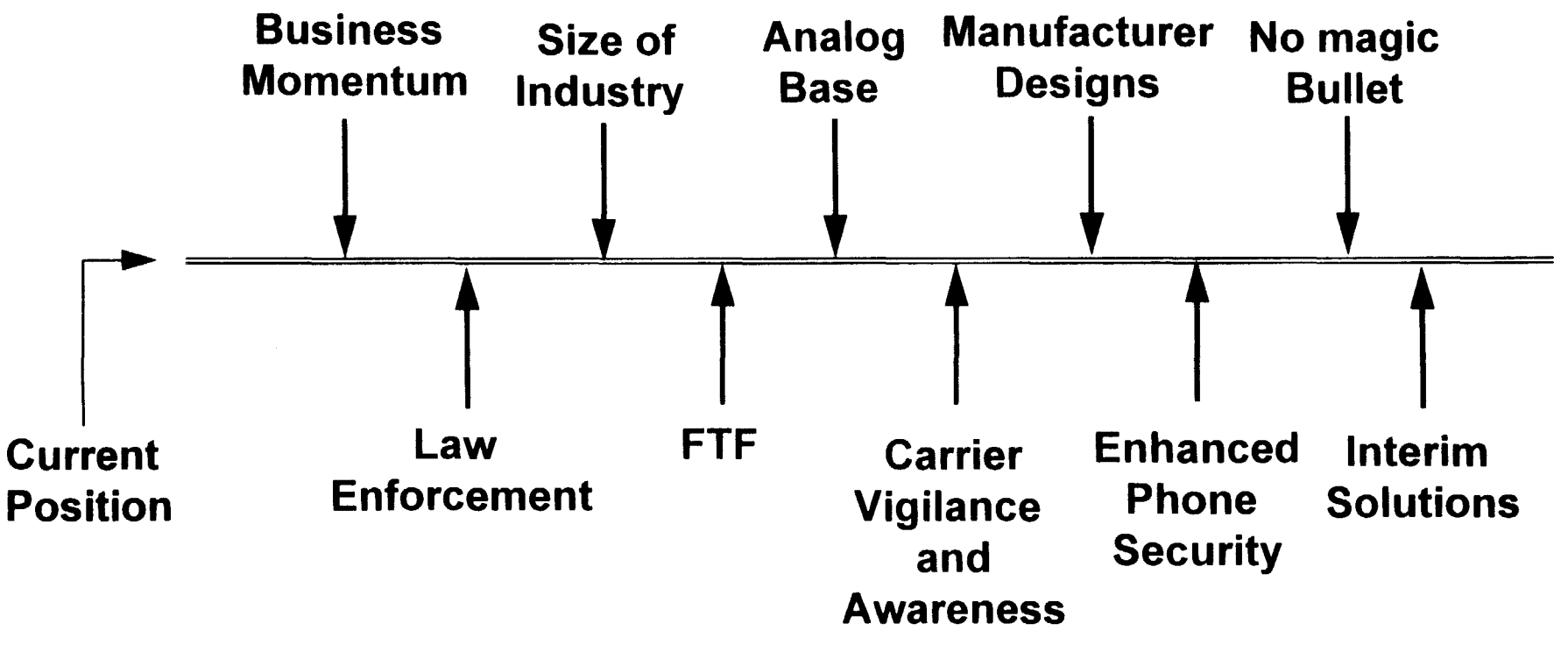
"The generation, distribution/issuance, storage, updating, destruction, and archiving of authentication keys (A-keys)"

Cellular Cryptographic Key Hierarchy – Security Enabler



Opposing Forces in the Fraud Game

Fraud contained throughout N. America



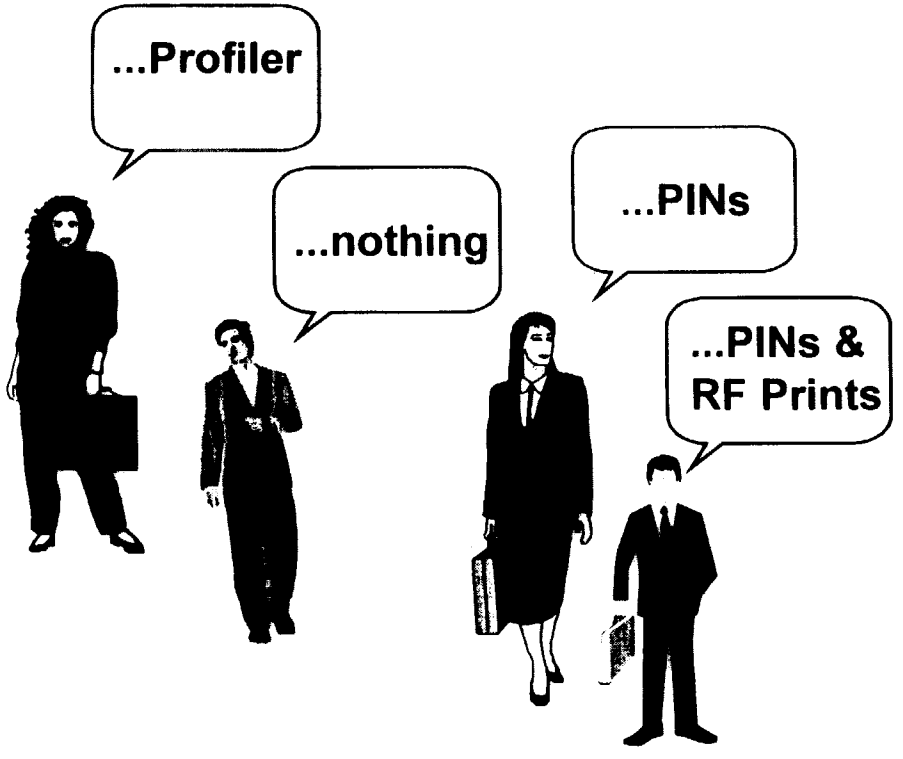
Fraud out-of-control in N. America

The State of Affairs – the Problem of Fraud Control

PROBLEM

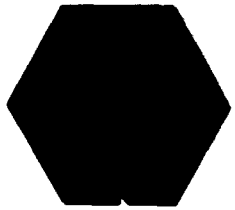
Current Environment (Fragmented)

We're using....



Tomorrow's Environment (Ubiquitous)

We're using...

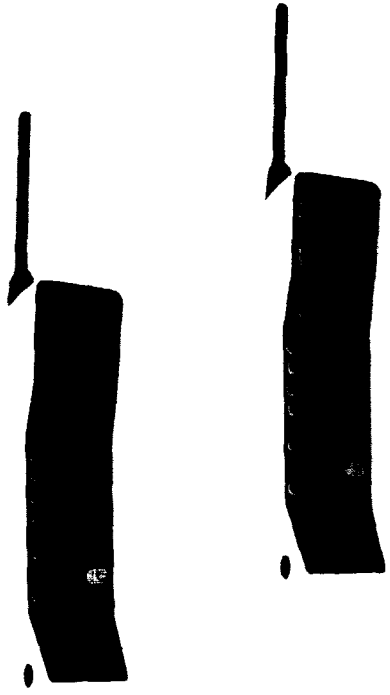


Top 18 International Cellular Markets

- United States – 33 Million
- Japan – 3,192,000
- UK – 2,733,000
- Germany – 2,280,000
- Italy – 1,841,000
- Canada – 1,600,000
- Australia – 1,443,900
- China – 1,212,400
- Sweden – 1,096,000
- France – 770,000
- Mexico – 123,000
- S. Korea – 677,200
- Thailand – 703,000
- Brazil – 598,000
- Finland – 595,000
- Taiwan – 570,000
- Mexico – 540,800
- Malaysia – 540,000

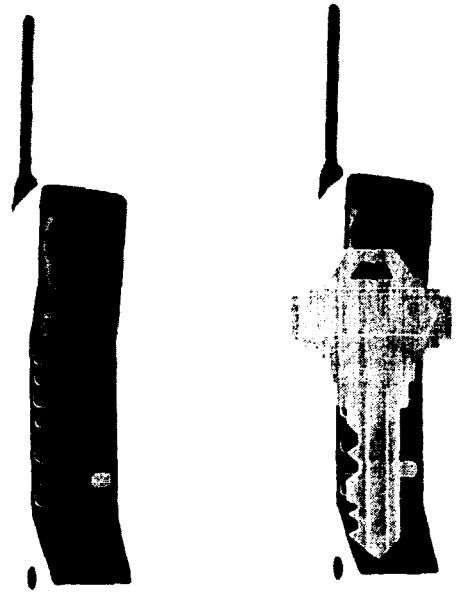
Eras of Cellular Telephony

Antiquity



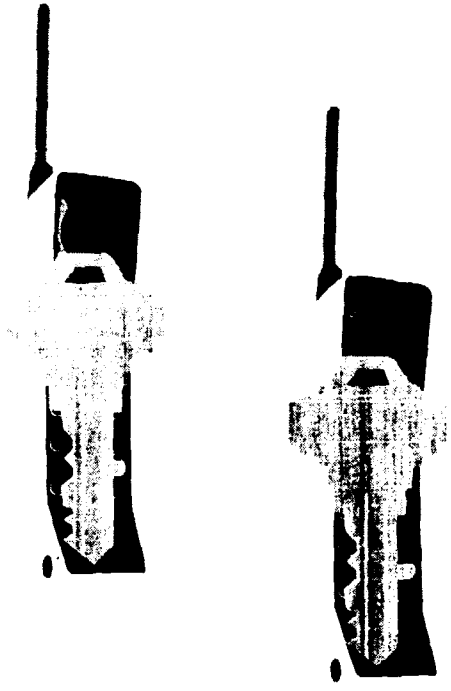
1983-1995
Identification

Sticky



1995-200?
Hybrid
Identification and
Authentication

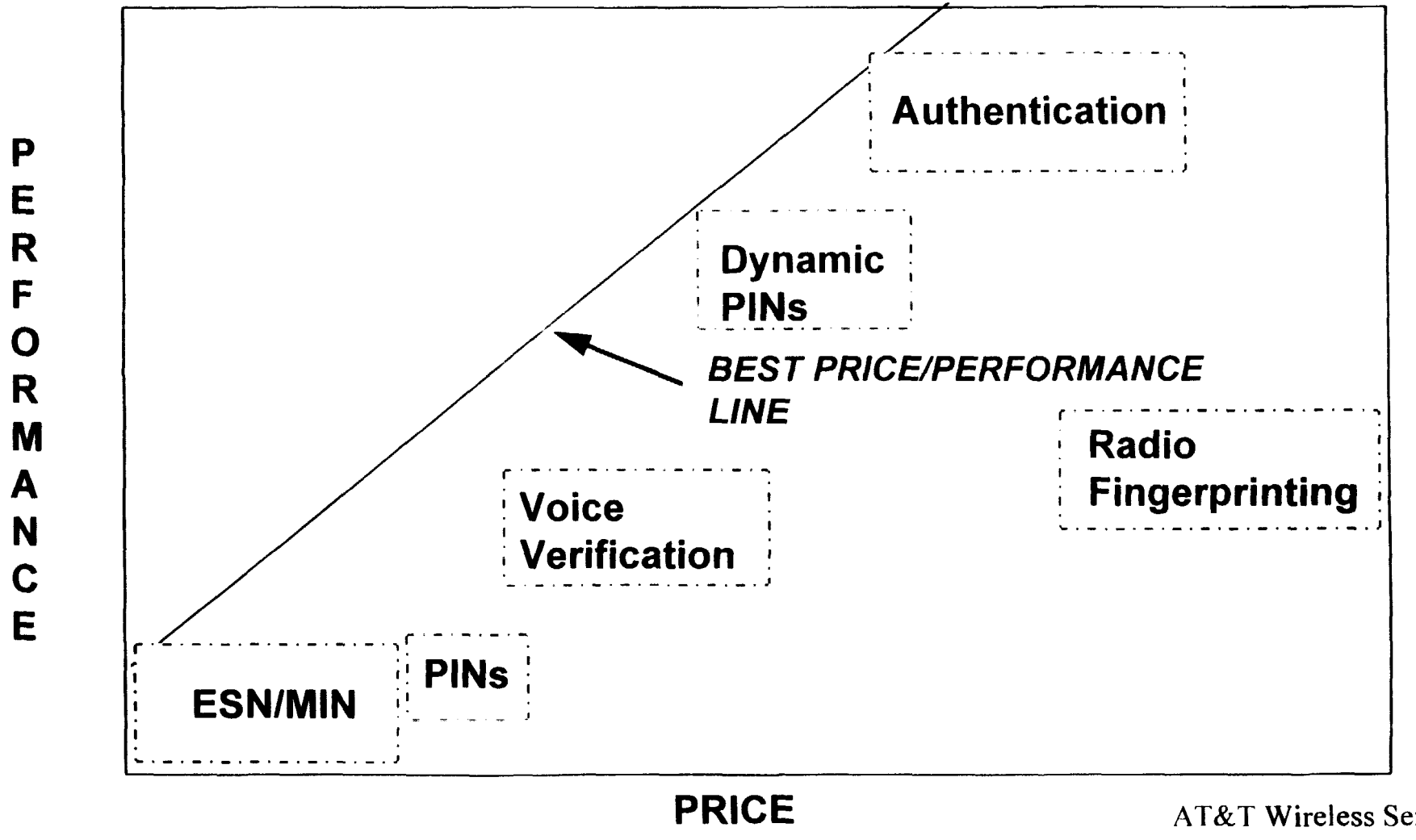
Ubiquity



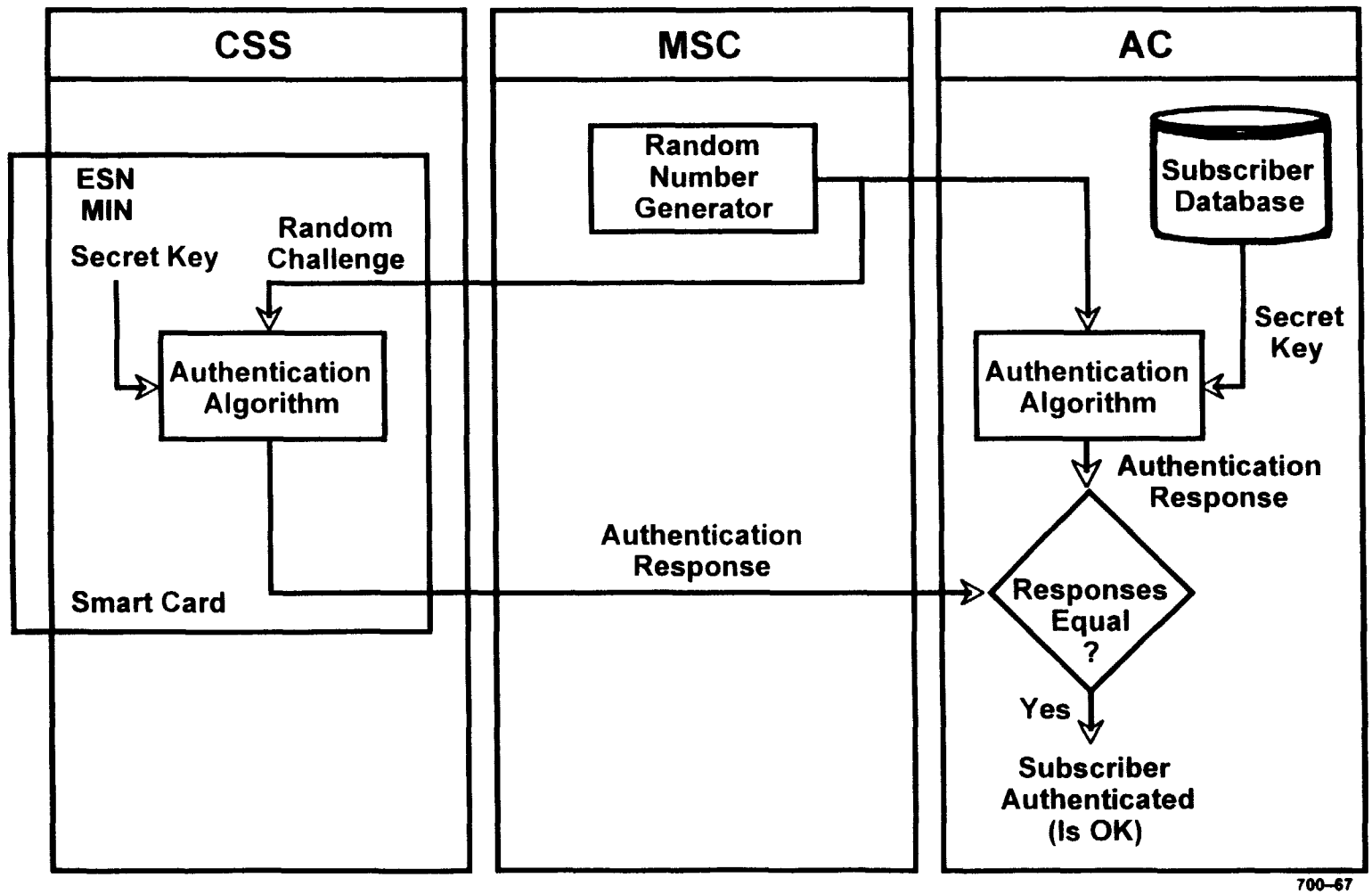
200?-20??
Authentication

AT&T Wireless Services

Fraud Solutions Price-Performance

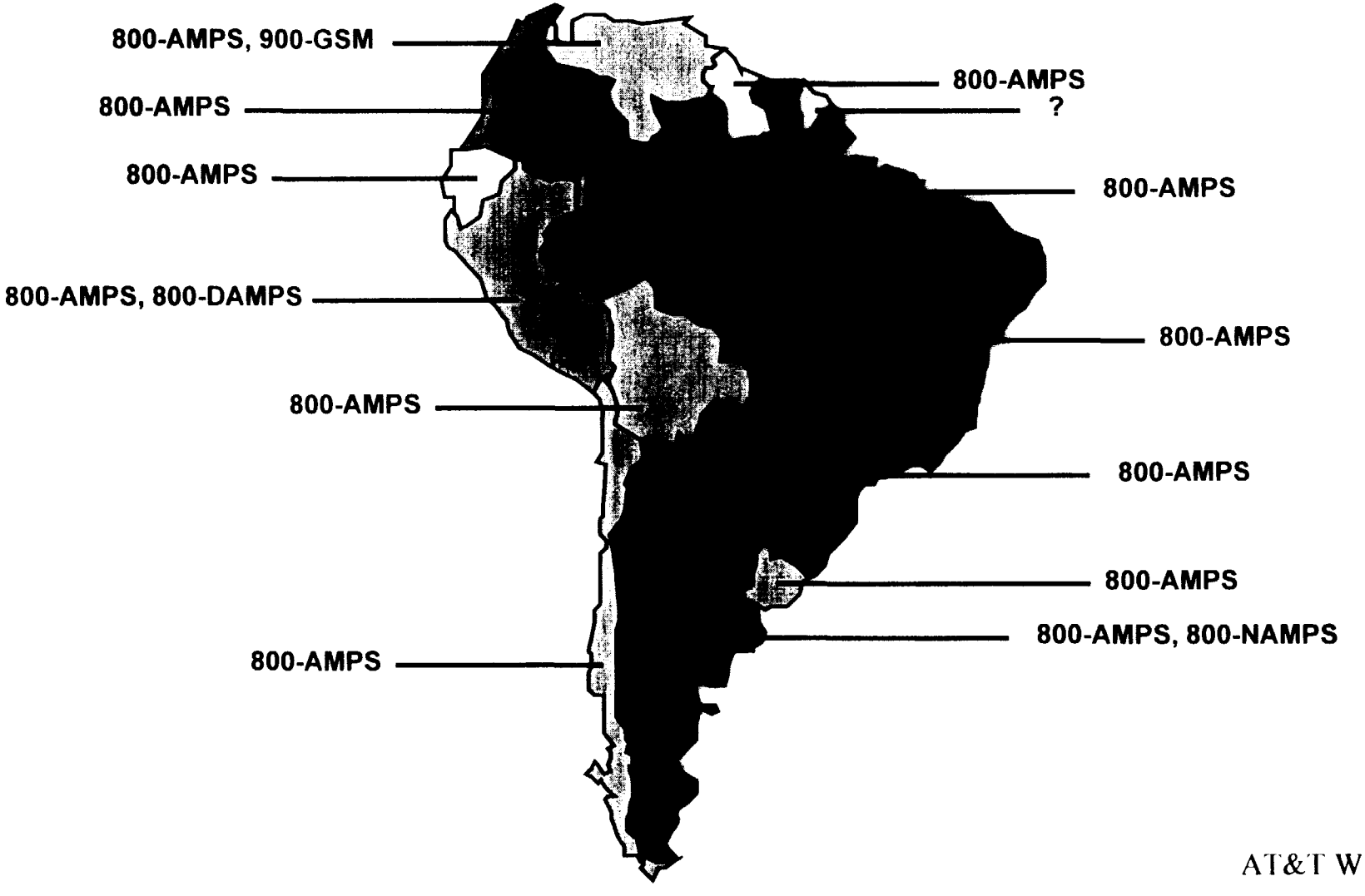


Authentication Scheme with Smart Card – GSM/PCS

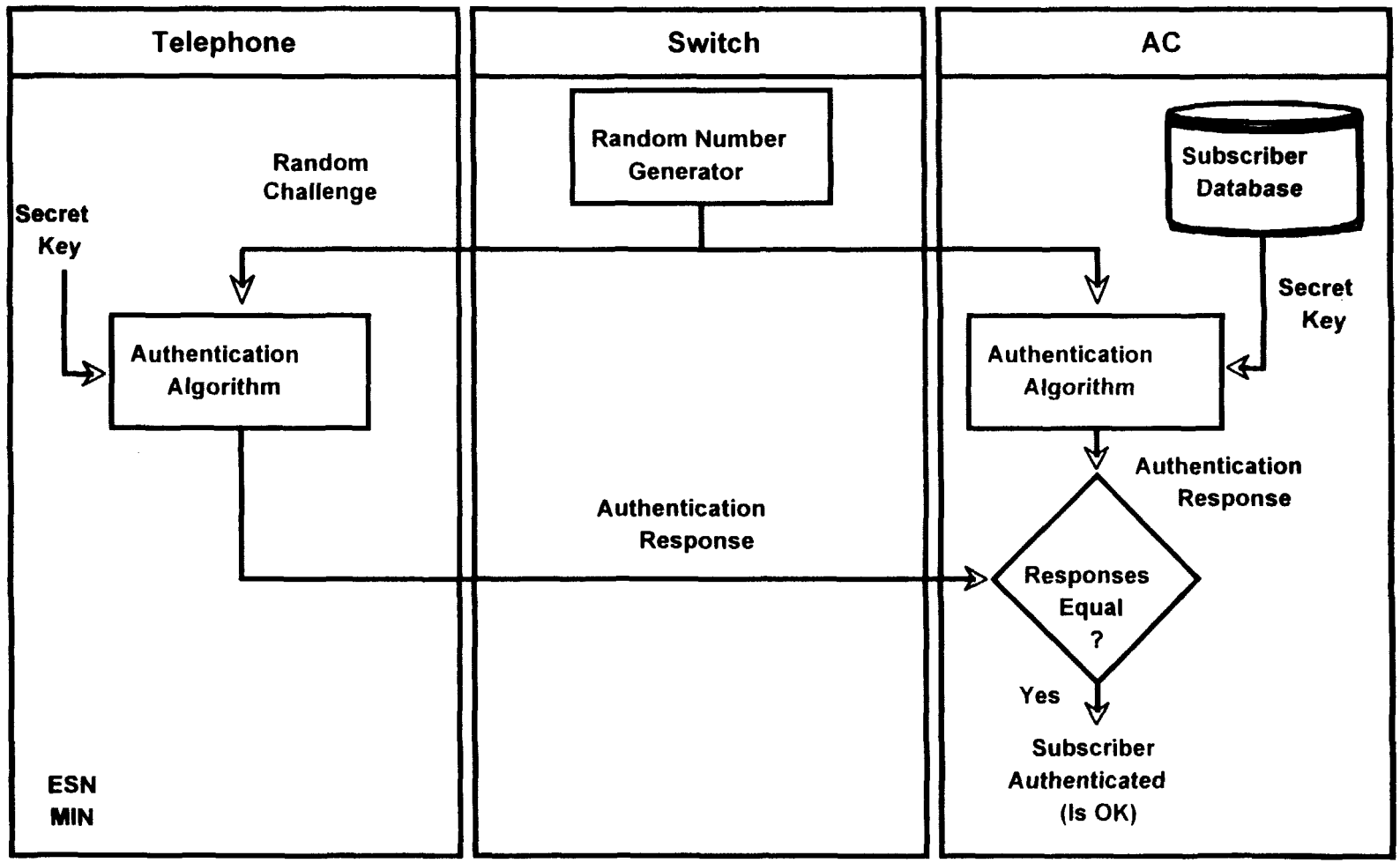


South American Countries

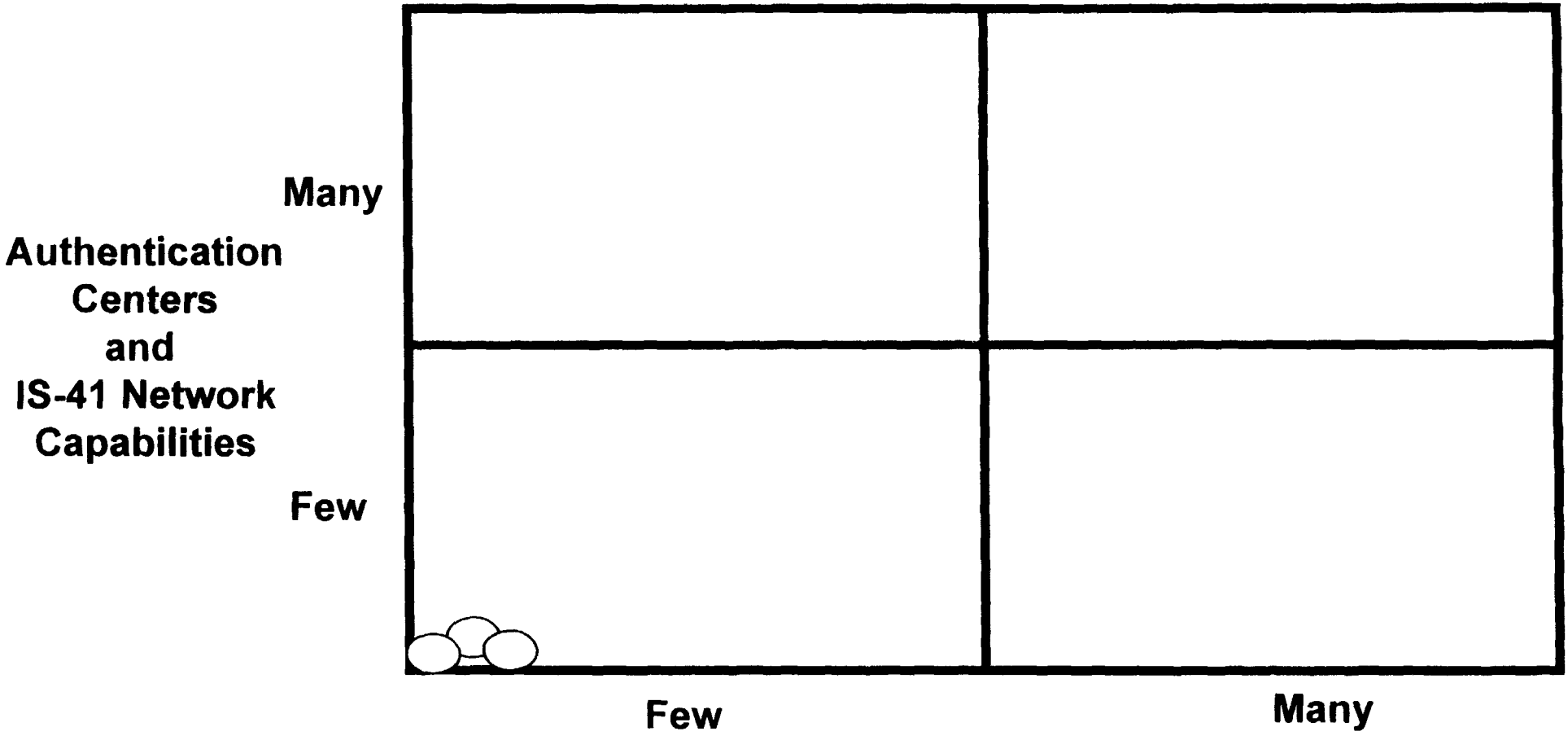
South American Countries Cellular Implementations



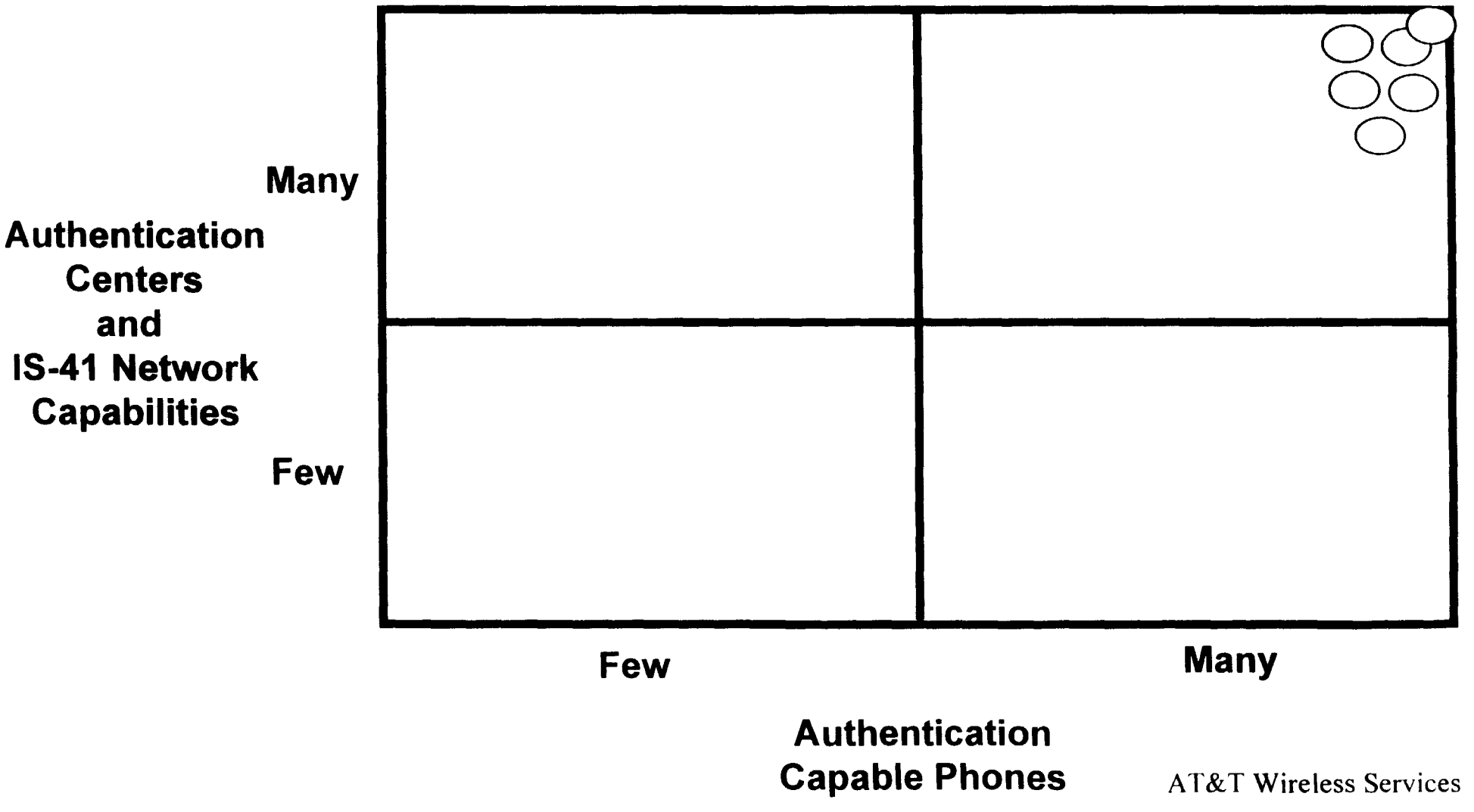
Principle of Cellular Authentication



Industry Authentication Effectiveness Map – 1995



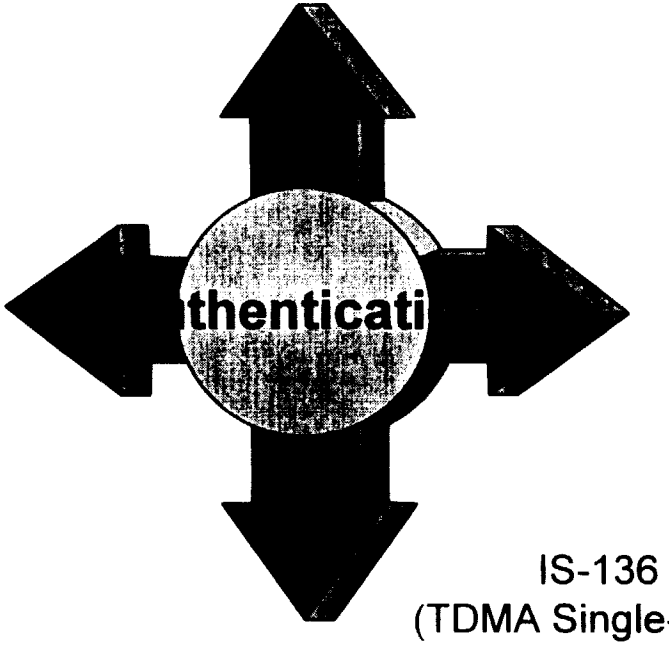
Industry Authentication Effectiveness Map - The Future



Authentication Alternatives for Cellular Telephones

IS-91
(AMPS/N-AMPS)

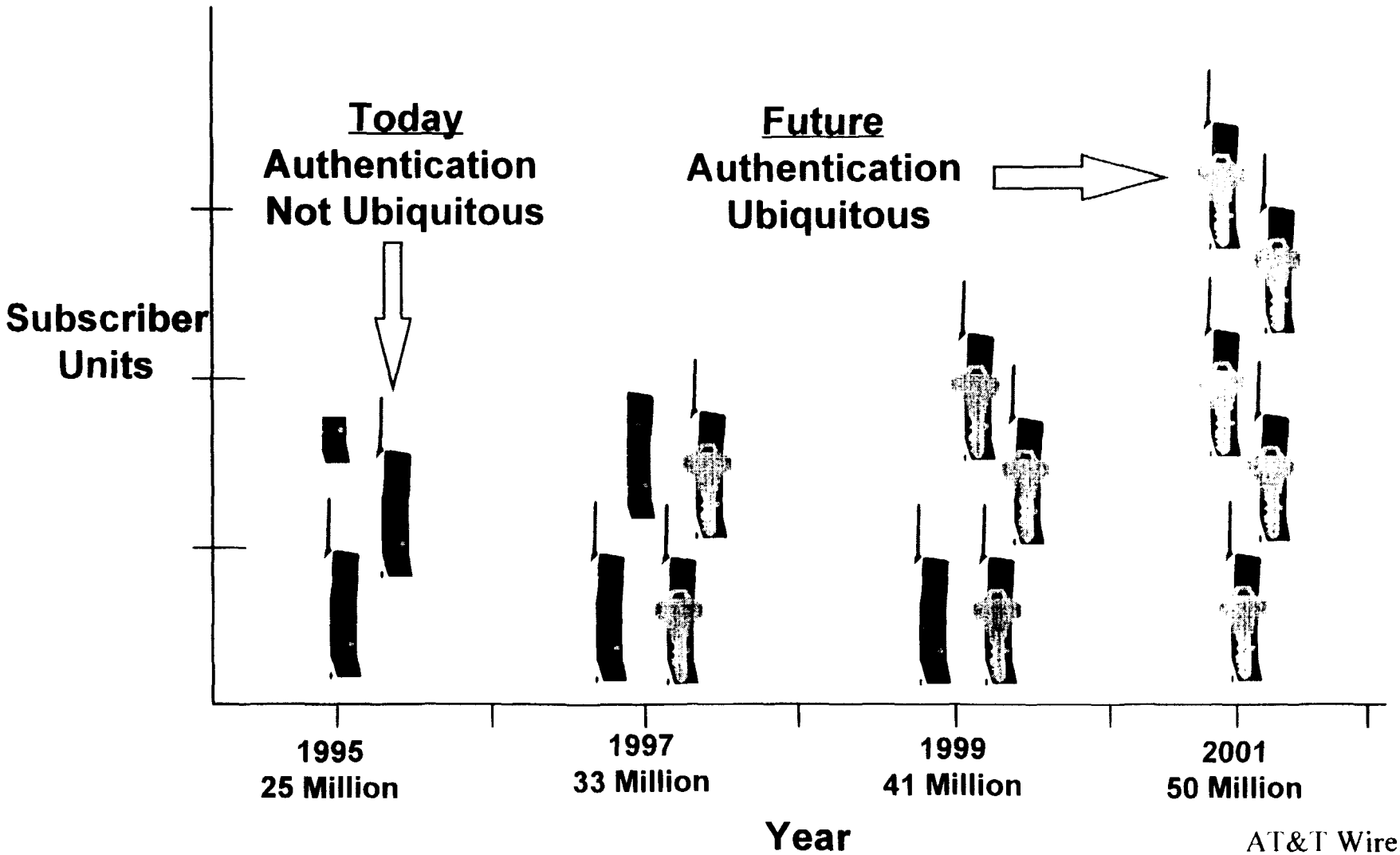
IS-95
(CDMA Dual-mode)



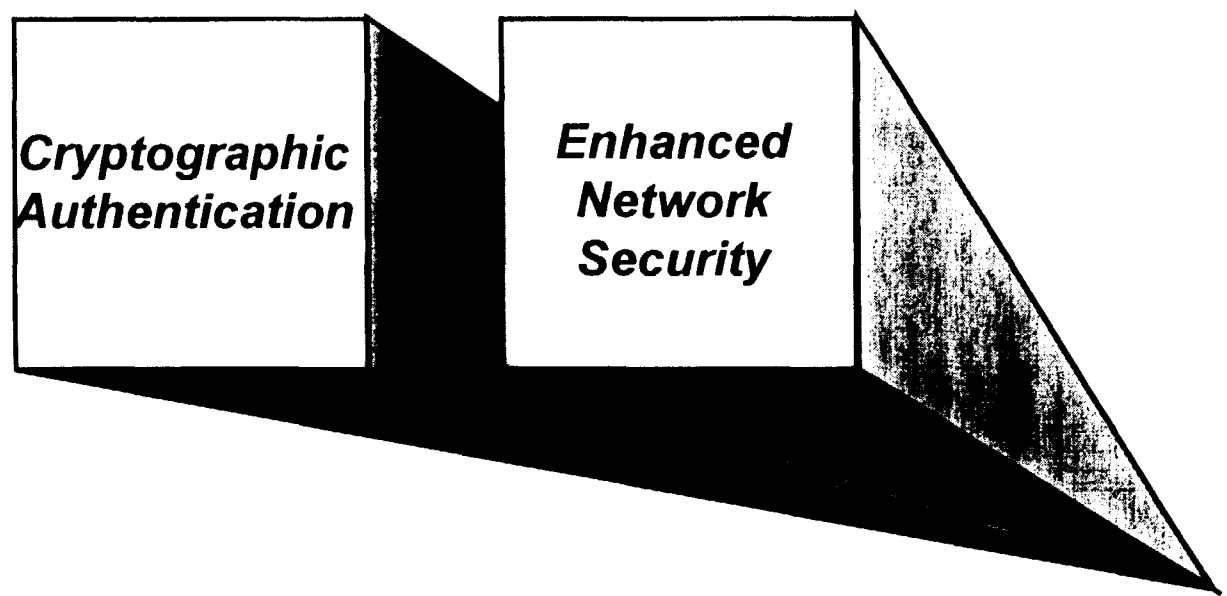
IS-54B
(TDMA Dual-mode)

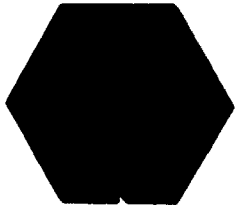
IS-136
(TDMA Single-mode)
and other
all-digital

Transitioning to Authentication Capable Telephones – A Strategy



Winning the Battle





Notes

Building The Wireless Future

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Michael F. Altschul
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May 16, 1996

Ms. Michele Farquhar
Chief
Wireless Telecommunications Bureau
Federal Communications Commission
2025 M Street, NW, Room 5002
Washington, DC 20554

Re: Revision of Part 22 of the Commission's Rules Governing the Public Mobile Services
CC Docket No. 92-115

Dear Ms. Farquhar:

On August 2, 1994, the Commission adopted a *Report and Order* in this proceeding implementing new Section 22.919 of the Commission's Rules to address the problem of cellular fraud. *In the Matter of Revision of Part 22 of the Commission's Rules Governing the Public Mobile Services, Report and Order,* CC Docket No. 92-115, 9 FCC Rcd. 6513 (1994).

Section 22.919 of the Rules establishes cellular equipment design specifications which require, *inter alia,* that cellular equipment's Electronic Serial Numbers ("ESNs") must be set at the equipment's manufacturing site, and must not be alterable, transferable, removable, or otherwise able to be manipulated by any party in the field. *Report and Order,* 9 FCC Rcd at 6525, ¶¶54-63. The Commission declined to make an exception to Rule 22.919 requested by some Telecommunications Industry Association ("TIA") members which would have allowed manufacturers' authorized agents to transfer ESNs in normal repair activities, and also declined CTIA's request to require that new cellular equipment comply with industry authentication standards. In addition, the Commission rejected C-Two-Plus Technologies' request for allowing the "emulation" of ESNs for "extension" phones.

After denying TIA's request for a stay of Rule 22.919 until resolution of its Petition for Reconsideration, the Commission permitted the new rule to go into effect on January 1, 1995. *See Order,* FCC 94-357, CC Docket No. 92-115, released January 10, 1995. Accordingly, both the Commission and the industry have had more than sixteen months of experience by which to measure the effectiveness of Rule 22.919. Based on that experience, CTIA urges the Commission to deny all of the pending petitions for reconsideration of this rule, including CTIA's request submitted February 2, 1995, in its *Joint Reply and Comment* filed with TIA. Simply put, the industry's experience since comments and reply comments were filed in January and February of 1995 demonstrates that there is no need to modify Rule 22.919, and therefore the Commission should reject the pending petitions for reconsideration.

It is often said that the vision of hindsight is 20-20. This proceeding affords a rare opportunity to take advantage of the clarity of this vision. With respect to the request for mandatory authentication set forth in TIA's Petition, and supported by CTIA and others on the basis that the Commission's failure to mandate authentication would delay implementation of a proven method of attacking cellular fraud, during the past sixteen months carriers and their vendors have moved aggressively to deploy authentication so that today authentication is a reality. The industry's need for authentication to combat cloning was so great that no government mandate was needed to make authentication happen. Authentication exists today in New York City, and it will be deployed in major markets throughout the United States by the end of this year. Based on the cellular industry's efforts and experience since comments were last filed in this proceeding, CTIA is confident that no rule is needed to make authentication available in all (or nearly all) cellular markets.

Similarly, TIA anticipated that modifications to Rule 22.919 would be required to avoid an adverse affect on manufacturers' repair and upgrade of cellular telephones in the field. TIA also expressed concern that adoption of the new rule would delay the introduction of new and improved cellular phones. In its February 2, 1995, *Joint Reply and Comment,* CTIA joined TIA in recommending a revision to Rule 22.919 to accommodate the manufacturers' concerns. However, the industry has been complying with the new rule for almost a year and a half, and none of these concerns have materialized. With the benefit of hindsight, CTIA now believes that no change to Rule 22.919 is required.

Finally, CTIA continues to believe that the Commission should flatly deny C-Two-Plus Technologies' request for allowing the "emulation" of ESNs for "extension" phones. Maintaining the integrity of the ESN is the cornerstone of the industry's technical efforts to preventing cellular fraud on today's analog cellular systems. The cellular industry has invested years of effort (not to mention millions of dollars) to develop and deploy three different technologies to combat cloning fraud: RF fingerprinting, velocity checking, and authentication. As AT&T Wireless Services sets forth in its May 3, 1996, *ex parte* submission in this docket, adoption of C-Two-Plus Technologies' proposed revisions to the Part 22 rules would eliminate all three of the industry's anti-fraud technologies, leaving the cellular industry with no technical weapons against cloning. This should be no surprise, since "emulation" is nothing more than a semantic ploy to avoid the word "cloning", which is the proper term to describe the conduct of duplicating a cellular phone's MIN and ESN combination.

Since "emulation" is indistinguishable on a technical basis from cloning, cellular carriers' ability to detect "emulation" is identical to their ability to detect cloning. Similarly, if the Commission were to adopt the C-Two-Plus Technologies' proposal to authorize the use of "emulated" cloned phones, carriers could not distinguish an "emulated" cloned phone from any other type of cloned phone.

Moreover, the Commission also has the benefit of hindsight with respect to this proposal. Since C-Two-Plus asked the Commission to modify its rules to permit the use of "emulated" cloned phones, a Federal District Court has clarified that what C-Two-Plus refers to as "emulation" falls squarely within the conduct prohibited by 18 U.S.C. §1029 of the U.S. Criminal Code. *See United States of America vs. Don Billy Yates, Jr., Opinion and Order,* Criminal Action 95-72 (ED Ky, Dec. 13, 1995). CTIA is not aware of any instance where the FCC rules authorize conduct that is criminalized under Title 18 of the U.S. Code.

Ultimately, the Commission must confront the reality that underlies both the technical and legal bases for denying the C-Two-Plus proposal: first, the analogy to landline telephone "extension" phones proffered by C-Two-Plus is bogus, and second, as described above, neither technology nor law enforcement can distinguish an "emulated" cloned phone from any other cloned cellular telephone.

The analogy to landline "extension" phones is flawed in numerous ways, but none so basic as the obvious fact that no matter how many terminal devices a landline customer installs on his premises to originate and terminate wired telephone service, there will be one and only one transmission path linking those devices to the telephone company's end office. In other words, landline extension phones do not afford telephone subscribers with multiple network connections and access. In contrast, cellular telephones are radios, and each cellular telephone can independently and simultaneously access a cellular system using different channels. In fact, unlike landline extension phones, there is no way multiple cellular phones simultaneously can access a single transmission path to the switch. While C-Two-Plus proposes to restrict the use of cellular "extension" phones to only one at a time, such a restriction is meaningless and unenforceable since the multiple phones (and their users) sharing the same ESN/MIN will be unable to detect if a clone is in use at the same time. This example offers yet another illustration of why the analogy to landline extension phones must fail.

For all of these reasons, CTIA does not support any change in Section 22.919, and urges the Commission to deny each of the pending petitions for reconsideration of this crucial provision of the Commission's cellular rules.

Sincerely,

Michael Altschul

Attachment